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THE UNIVERSITY OF ALBERTA
AN INFORMATION-DECISION SYSTEM FOR
MONITORING STUDENT ACADEMIC PERFORMANCE

by



HAROLD KNOPKE

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
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OF MASTER OF BUSINESS ADMINISTRATION

FACULTY OF BUSINESS ADMINISTRATION AND COMMERCE

EDMONTON, ALBERTA

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THE UNIVERSITY OF ALBERTA
FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "An Information-Decision System for Monitoring Student Academic Performance" submitted by Harold Knopke in partial fulfilment of the requirements for the degree of Master of Business Administration.

ABSTRACT

This study concerns itself with the problems encountered when a computer is added to a manual system of processing student academic records. A straight manual system is flexible but tends to become slow when there is a large volume of data to be processed. The introduction of a computer to process such a volume is logical and we show that with the proper definition of decision rules, it also becomes possible for the computer to be used in the decision making process. We develop a system in which the computer can make the academic rulings for most students, provide both Faculty and students with a clear, concise, cumulative record of academic performance, permit continuous monitoring of student academic performance, provide advice and guidance whenever required, yet still keep the Faculty and not the computer in control.

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CHAPTER I

INTRODUCTION

From the late 1950's on, The University of Alberta experienced large increases in enrollment and subsequent large increases in the number of academic programs available to students which combined to prove the manual system of processing student records to be inadequate. At about the same time, tabulating equipment and computers to process large volumes of data became available. Some routine, high-volume applications were converted from manual to machine processing but to accomplish this, some inflexibilities were introduced into the system. In some cases these proved to be unacceptable and exceptions were made which reduced some of the advantages of the machines. As quickly as machines were incorporated into the system, newer, more powerful machines were announced by manufacturers and better programs were developed. Since these machines and programs seemed better able to handle the exceptions and could also process more data and applications, more applications were converted to machine processing with the resulting inflexibilities and consequent exceptions. While these iterations went on, the enrollment, the variety of academic programs, changes and therefore the volume and complexity of data to be

processed kept increasing which multiplied the opportunities for errors. The increased error possibilities necessitated additional controls and backup procedures. The outcome of this is that at the University of Alberta there are two almost completely parallel systems--one manual and the other automatic.

Not all universities experienced the same problems. The exceptions invariably are smaller, or newer without the millstone of traditional systems, or they have relatively inflexible, tightly-controlled curriculae. (A number of cases are documented by Koschler [7], Simmons [10], and Zawodny [13]).

For the Faculty of Business Administration and Commerce at The University of Alberta, the result has been that the Faculty Revisions Committee--the body charged with the responsibility of reviewing students' academic performances--instead of being solely an academic ruling body, has also become a control mechanism in the information flow between Faculty and Registrar and therefore responsible for processing a large volume of data manually in a very short time--relying chiefly on the manually-updated student record card (The Faculty's record of a student's academic history) for accuracy and background information when making its rulings.

The volume and complexity of student data to be processed within the existing system have caused a situation in which processing the records has almost become an end in itself, leaving little time or energy to consider what is being accomplished. Students with problems do not receive the individ-

ual attention they need and the Faculty does not have a good overall picture of the performance of students because neither the necessary time nor the resources are available.

This study shows that a system can be developed within the existing framework which, by utilizing the computer's decision-making ability, can reduce the workload of the Faculty Revisions Committee substantially, provide accurate cumulative and current information for both faculty and students, eliminate the need for the student record card as a control device, yet still allow exceptions by identifying them and bringing them to the attention of the Faculty Revisions Committee. This permits routine cases to be handled by the computer thereby allowing greater attention to be paid to more difficult cases. Difficult cases exist because the rules are not completely defined, errors may have been made or the amount of information to be processed is such that it becomes difficult to apply all of it to the problem. While the problem of defining the rules is beyond the scope of this study, the problem of processing a large amount of information is not. This study shows it is possible to do so by using a computer thereby increasing the number of routine cases which of course, means reducing the number of difficult cases. Even the difficult cases become simpler because more information is now available in a simpler fashion.

Continuous monitoring of student records is possible which makes it more likely that errors will be detected early.

The system developed here provides continuous and complete information to students about where they stand in the program and what is expected of them to meet minimum graduation requirements.

Among other benefits for the Faculty is that it facilitates the generation of statistics about performance of special studies or programs. For instance, it might be desirable to monitor transfer students' performance. Input to pre-planning for computerized registration as well as computerized time-tabling is now made much simpler. Finally, since faculty and students receive the same information, misunderstandings about program requirements are likely to be minimized.

CHAPTER II

THE EXISTING SYSTEMPermission to Register¹

Students who have not attended the University before, and students who are transferring from one faculty to another, must first obtain permission to register in the faculty of their choice. New and transferring students must submit an application form and a transcript of their grades. Re-enrolling students submit an application for re-enrollment.

Most faculties have delegated the initial screening of applications to the Registrar who admits and rejects clear cases and submits the remainder to the faculty. Once the faculty approves a student's application, the Registrar officially gives him permission to register. Continuing students are not required to re-apply; they need only present themselves for registration.

¹This and the following steps are flow-charted in Appendix A.

Registration

With permission to register, the student sometime during registration week, submits to his faculty a list of the courses he plans to take. This is done on the so-called "number 2 card". If he obtains faculty approval of his program, he seeks permission from the teaching departments to be assigned to particular course sections. It must be noted here that, although the faculty can approve a student's choice of courses, only the teaching department is empowered to assign the course section. If the teaching department is unable to assign the student to a given section, or time-tabling conflicts prevent the student from taking a particular course, he must then obtain faculty permission to register in another course and repeat the cycle. Once the student has been assigned course sections, he submits one copy of his program card--the list of courses which constitute his current academic program--to his faculty and one copy to the Registrar. In addition, he receives one Hollerith card --called course card--for every course he plans to take. These are given to the Registrar to form the basis for class enrollment lists.

At this point three separate filing systems show which courses the student is registered in. One file consists of the program cards submitted by the students to their faculties. An identical file exists at the Registrar's office. The third is a computerized file of all the individual course cards.

Post Registration

Within approximately two weeks of registration, the Registrar sends a duplicate list of students registered in each section to the teaching departments. The top copy is meant to be the roll book for the instructor and the second copy is a class list for the teaching department.

From registration day to the deadline for course and section changes, changes are requested by students. As during registration, course changes are approved by the faculty and section changes by the teaching department. Copies of these changes are filed by both the faculty and the teaching department if a course is changed, but only by the teaching department if a section is changed, and by the Registrar in either case. Approximately 30,000 of these changes are received by the Registrar in one winter session. This figure includes changes made in January regarding second term courses.

After the deadline for course and section changes, the Registrar's office produces updated roll books and class lists. These are sent out in triplicate. One copy becomes the instructor's roll book and another is a class list for the teaching department. Any errors or omissions are to be noted by the teaching department on the third copy which is returned to the registrar. It is then used for corrections to the students' records kept by the Registrar.

Examination Results

Shortly prior to examination week, the Registrar sends the examination returns forms to the teaching departments. These forms are the means by which the Registrar and the student's dean are informed of the grades awarded in individual courses. The student's name, identification number and faculty are already on the form when the teaching department receives it. All students from one faculty registered in the same course and section number will appear on one form. Thus for any one course section there will be as many forms as there are faculties represented by the students in that section.

This also means that a student's name will appear on as many forms as the number of courses he is registered in. The students' grades are entered by the teaching departments and copies of the forms distributed. One copy goes to the Registrar, one copy to the student's faculty and one copy is filed by the teaching department. Since there are no teaching departments in the Faculty of Business Administration and Commerce, two copies are filed for Commerce students instead of only one.

The Faculty Revisions Committee

When the grades from the teaching departments have been received by the Registrar, his office produces the work sheets for the Faculty Revisions Committees. The work sheets are lists of students, the courses they were registered

in this academic year and the grades received. They may also contain the grade point average, the quality index and instructors' recommendations to grant or withhold supplemental privileges in case of a failing grade. The Faculty Revisions Committees are given the following instructions, among others:¹

"Grade Points are calculated by multiplying the student's grade in a course by the course's weight factor. If there is no grade or it is not used in computing the student's grade point average, the weight factor and grade points will be enclosed in brackets and excluded from the totals for those columns.

The grade point average (G.P.A.) is calculated by dividing the total grade points by the total weights. The results of supplemental examinations are excluded from the calculation.

G.P.A.'s are computed only for students for whom no grades are missing from the work sheet.

If the record for a student was incomplete at the time the work sheets were prepared, totals and grade point averages will be calculated by computer after the missing marks have been entered by the Faculty Revisions Committee. Therefore, it is not necessary for Revisions Committees to amend totals or calculate G.P.A.'s in such cases unless they wish to do so for the Faculty records.

The quality index is used in determining the categorization of a student.

$$QI = \frac{\text{Number of Credits Passed}}{\text{Numbers of Credits Attempted}} \times \text{Grade Point Averages.}''$$

It is the Faculty Revisions Committee's responsibility to review these records;

- a) to ensure their accuracy and completeness and
- b) to make academic rulings as outlined by University regulations.²

¹See Appendix F for complete instructions accompanying the Faculty Work Sheets.

²1972/73 University of Alberta Calendar, sec. 16.

Although the Committee is not responsible for the accuracy of the work of the Registrar's Office, it is responsible for the accuracy of the information submitted by the Faculty and must therefore devise appropriate control procedures. If courses or grades are missing or inaccurate, it is the Committee's responsibility to correct this.

Academic rulings fall into two categories: Rulings on individual courses and rulings on a student's overall academic progress. Course rulings may be one of the following:

- C - credit conceded
- D - granted deferred final exam
- F - failure, no supplemental granted
- N - passed, but credit withheld
- S - failure, supplemental granted

Rulings on a student's academic progress first place him in one of categories A, B, or C depending on his quality index.

Category A = $QI \geq 4.0$

Category B = $4.0 > QI \geq 2.0$

Category C = $2.0 > QI$

Generally, these categories determine if he is to be promoted (permitted to continue in the program), must repeat part or all of his program, or must withdraw. Individual faculty or school requirements differ and in special circumstances the Committee may exercise discretionary powers. Secondly, the Committee must also determine:

- a) if a student has met graduation requirements

b) if a student has merited academic honors (e.g. Dean's List, First Class Standing, Graduation with distinction)

c) if special restrictions are warranted (e.g. a student from another educational system may be required to meet certain standards before being allowed to proceed)

d) if special restrictions have been fulfilled.

Final Grade Reporting

After the Faculty Revisions Committee reviews the work sheets, one copy is returned to the Registrar who uses these to make the indicated changes on the student master file. Separate computerized master files are kept for each winter session, each summer session and for each set of supplemental and deferred examinations. No cumulative file exists to date. The information mailed out to notify the students of their grades is retrieved from the most current master file. In addition, those faculties who request them, can obtain gummed labels with the record of the performance during the current academic year printed on them. These may be attached to the student record card kept by the faculties.

Registration and Grade Reporting in the Faculty of Business Administration and Commerce

Shortly after registration week each fall, the practice in the Faculty has been to copy each student's courses from his program card to his student's record card, the idea being to have his complete record in one place. Only the course names but not the section numbers are copied. Any

changes in registration made by the student are then entered on his record card but not on his program card. At the end of each term, the grades are copied onto both the record card and onto the examination return forms. When the Faculty Revisions Committee subsequently receives the faculty work sheets, each student's record card is compared to the list of courses and grades on the work sheets to ensure compatibility.

In most other faculties, the courses--and later the grades--are not manually copied onto the student record card. The gummed labels are used instead. The program card is used in the interim to keep track of the student's registration. The difference between the two methods is that, in the Faculty of Business Administration and Commerce, the record card and the Faculty Revisions Committee become control mechanisms to ensure that the Faculty's and the Registrar's information about the students is the same. In other faculties these two records have to be the same since the final information about courses and grades comes from the same source, namely the current computer file of all students. This does not imply that other faculties have more accurate records. It only means that one source of transcription errors is eliminated at the expense of possibly not detecting other errors.

Comments on the Present System

It must be noted that there are two parallel registration, grade reporting, and recording systems in existence. One is manual, the other is partially computerized. This means that

all information must be duplicated and (to ensure that both systems contain the same information) several controls are required which would not be necessary if only one system were maintained.

One obvious example of this is the grade reporting procedure used. If the computerized system did not exist, instructors would possibly be able to submit a carbon copy of their roll books to the Registrar. Under the present system, clerical staff in the teaching departments must post the grades from the instructors' roll books to the examination return forms. The examination return forms are pre-numbered by computer and when the grades are transferred to machine-readable form, only the page number and the grade are used. Because this method relies on proper sequencing for accuracy, any deletions or additions of names at the teaching department level cause problems which must first be corrected before the data is of value to the computerized system. Also, the double transfer of information, first from roll book to examination return form and then from examination return form to machine-readable media, increases the possibility of error.

The Faculty of Business Administration and Commerce uses a double checking system to ensure that its files contain the same academic information about students as do the Registrar's. It can be argued that this system does not necessarily ensure greater absolute accuracy. Part of the reason is the volume of data involved. There are some 1,500 students registered in this faculty whose average course load

is almost ten term-courses, which means that around 15,000 course names must be transferred from program cards to record cards. Some course names are pre-printed on the record card but some type of notation is still required to indicate whether or not a student is registered in a certain course.

Between registration week and the deadline for registration changes (about three weeks later) around 3,000 requests for course and section changes are processed.

Once grades are received from instructors, it is usually the same person who copies the grades onto both the examination return forms and onto the student record card. Considering that this must be done in about two weeks and that each student's record card must be retrieved up to ten times, it is unlikely that here and in the prior steps no errors are made. The same transcription error for instance, could be made twice and go undetected despite the checking by the Faculty Revisions Committee.

Nevertheless, the large volume of data to be processed by the Committee in such a short time makes it difficult for the Committee to give each student's record the detailed attention it may require.

CHAPTER III

THE STUDY

Introduction

In this study we develop a computerized system which can

- a) Make the academic rulings for most students.
- b) Identify those students for whom a Committee decision is not required.
- c) Rank students academically each year.
- d) Determine if graduation requirements have been met.
- e) Eliminate all hand posting of course registration and grades as well as the student record card as a control mechanism.
- f) Avoid posting errors and reduce the Committee's importance as a control mechanism ensuring the accuracy of records.
- g) Provide both Faculty and students with a clear, concise, cumulative record of academic performance.
- h) Inform the student of where he stands in the program and permit him to check for errors.
- i) Insure that Faculty and students possess

identical information, and verify that the student is kept informed of his progress.

j) Permit continuous monitoring of student academic performance and provide advice and guidance whenever required.

Aside from a substantial saving in faculty and clerical staff time, the greatest benefit would be to students by allowing the Faculty to give greater attention to those students requiring it. In addition, avoiding some of the errors in grade reporting and posting which have occurred in the past is equally significant. There have been cases where a student was misinformed about the number of courses required for graduation and his graduation delayed as a consequence. Such errors are of course very grave.

Accuracy of Records

If instructors post the grades in their courses at the completion of the term, then the students could be counted on to report a discrepancy between the grade posted and the grade which the student receives from the Registrar (at least as long as the difference was not the student's favour). If errors in reporting grades can be considered to occur randomly, this procedure should account for approximately half of all errors. The rest would be caught in the procedures outlined below.

There are two feasible methods of reporting grades to the Registrar which differ from the present. One requires

a modification to the present system used in the Faculty of Business Administration and Commerce but would not require changes beyond the Faculty. The other, which is more extensive, would eliminate the examination returns form, hence requiring significant changes in the registration procedure; this in turn would force changes in every other faculty in the University.

The first system which is recommended as preferable requires that the grades be keypunched directly from the instructors' roll books. Accuracy can then be assured by using the standard method of verification through redundancy punching, that is, the records are punched twice except that the second time they are not actually punched but only compared electronically against the first punch. Key punching could reduce the time required to report grades from around two weeks to one day (Appendix C).¹ The second system is outlined in Appendix D.

Either method would eliminate the need to manually transfer grades to the student record card. If the program card were kept current by entering course changes on it instead of transferring the information to the student record card, considerable clerical time would be saved, no transcription errors would be introduced, and the Faculty would still have an accurate current record of the students' registration.

¹The present method which requires around two man-weeks in just Business Administration and Commerce saves the Registrar only around 106 man-hours when processing grades for the whole University. (Appendix B).

Creation of a Master File

This system requires that initially a computer master file of student records be created where each record contains the cumulative academic information for one student. The registrar did not have such a cumulative machine-readable file although a separate tape did exist for each session for each year, (winter session, summer session, supplemental and deferred examinations). To minimize incompatibility of the new cumulative tape with the individual tapes, the same type of variable-length, variable-blocked record formats were used although three pieces of information were added to the unused part of the record. These consisted of an indicator to differentiate active from inactive students, the year and lastly the session in which a course was taken. The problem of whether a student is active or inactive is taken care of in the update part of the procedure which considers a student active if he appears on the faculty work sheets and inactive if he does not. All information not contained in the file directly and appearing on subsequent reports is determined by the programs.

The master file of all Commerce students (since 1967/68) is designed to be updated permanently after each session and temporarily prior to the end of the session from the files used to produce the faculty work sheets. After each update, a program analyzes each student's record

to produce the student reports which become the primary reference documents for the Faculty Revisions Committee. They show the student's performance to date, summarize it, recommend academic rulings based on pre-defined criteria, list remaining requirements, and draw attention to special cases. The permanent update will record in the student's record the rulings authorized by the Faculty Revisions Committee. These may be either the rulings recommended by the program or those decided on by the Committee.

Initial Performance Evaluation

After the file has been temporarily updated, a subsequent program evaluates the record of each active student. For each session (winter and summer), the grade point average is calculated. For the current session the quality index is calculated also.¹ Since non-numeric grades may have been assigned, each grade is evaluated according to Table I. This is one of the decision tables presently incorporated into the program, but which can readily be changed. The purpose of the tables is to separate the logic required to communicate with the computer from the logic required to analyze student performance and recommend action. For instance, if the rules pertaining to performance analysis change, the input-output

¹If a course has been repeated, the highest grade is used to calculate the grade point average but each failure and/or pass is reflected in the quality index.

operations of the program would not be affected.

In Table 1, all possible grades are on the vertical and all possible qualifying remarks are on the horizontal axis. A letter at the intersection of a row and column specifies how this combination is handled by the program. A "Y" at the intersection indicates that this course is considered to be a pass, an "N" represents a failure, and no entry (neither a failure nor a pass) causes the grade to be omitted from the calculations. The last situation would occur in case of an authorized withdrawal from a course, for instance, or in case of error. A grade of "9" where credit had been withheld would be an example of such an error.

After the grade point average and the quality index have been calculated, the current course load is determined. To do this, the weights of courses with either a numeric grade or a grade of any of "AE", "AB", "CR", "DB", "F", "IN", or "WF" are summed.

The program makes academic rulings based upon the student's current load and quality index in accordance with Table 2. This table represents the system of academic probation and performance currently in use at The University of Alberta with some minor modifications. The computer program is not dependent upon this particular set of criteria; the decision tables can be modified to fit alternative criteria

TABLE 1

CONDITIONS UNDER WHICH CREDIT WILL BE
CONSIDERED GRANTED OR WITHHELD

GRADE	QUALIFYING REMARK							
	no remark	C = credit conceded	D = granted deferred final	F = failure, no supplemental g granted	N = credit withheld	S = failure, supplemental granted	+ = course extra to degree requirements	Any other symbol
AB = absent from final exam	N	Y		N	N	N		
AE = aegrotat standing	Y	Y			N	N		
AU = auditor								
CR = completed requirement no grade assigned	Y	Y					Y	
DB = debarred from final exam	N	Y		N	N	N		
EX = exempt		Y						
F == failure, no grade assigned	N			N	N			
IN = incomplete	N	Y		N	N	N		
RC = registration cancelled								
W = withdrew with permission								
WF = withdrew failing	N			N	N	N		
9	Y	Y					Y	
8	Y	Y					Y	
7	Y	Y					Y	
6	Y	Y					Y	
5	Y	Y					Y	
4	Y	Y		N	N	N	N	
3	N	Y		N	N	N		
2	N			N	N	N		
1	N			N	N	N		
any other grade symbol				N				

provided that the decision rules can be specified with a certain precision.

Determination of Required Courses Remaining

To determine which required courses remain in the student's program, a table of required courses and possible equivalents is set up. If the student is registered in one of these, the course is evaluated according to Table 1. If credit has been granted, an indicator representing the course is set. After all courses have been evaluated for a student, logical expressions are evaluated for equivalent courses.

e.g., Econ 301 OR ((Bus 322 OR Bus 323)
AND (Bus 332 OR Bus 333)).

If the expression is TRUE, the indicators for all courses in the expression are set. If the expression is FALSE, indicators for courses to the left of OR operators are set giving due regard for limitations imposed by brackets. All courses in the table of required courses whose indicators have not been set are printed as Required Courses Remaining in the student's program.

In the example above, if a student had received credit for Bus 323, the indicators for Econ 301, Bus 322 and Bus 332 would be set by the logical expression, and Bus 333 would remain as a required course.

TABLE 2

RECOMMENDATION DECISIONS

Quality Index	CURRENT COURSE LOAD	
	≥ 30 credits	< 30 credits
$QI \geq 7.5$	FIRST CLASS STANDING RETAIN CREDIT FOR ≥ 4.0	CAT A. PROMOTE, (OVERLOAD PERMITTED)
$7.5 > QI \geq 5.0$	CAT A, PROMOTE, (OVERLOAD PERMITTED) RETAIN CREDIT FOR ≥ 4.0	
$6.5 > QI \geq 5.0$	CAT A, PROMOTE, (NORMAL LOAD)	
$5.0 > QI \geq 4.5$		RETAIN CREDIT FOR ≥ 4.0
	RETAIN CREDIT FOR ≥ 4.0	RETAIN CREDIT FOR ≥ 4.0
$3.5 > QI \geq 2.0$	CAT B, REPEAT YEAR, (NO OVERLOAD) RETAIN CREDIT FOR ≥ 5.0	CAT B, REPEAT YEAR (REMAIN ON PARTIAL LOAD)
$3.0 > QI \geq 2.0$	CAT B, REPEAT YEAR. (MAX. LOAD ** CREDITS PER TERM)	
$2.0 > QI$	**=3 CREDITS LESS THAN PRESENTLY RETAIN CREDIT FOR ≥ 5.0	CAT C, WITHDRAW FROM PROGRAM RETAIN CREDIT FOR ≥ 5.0
	CAT C, WITHDRAW FROM PROGRAM RETAIN CREDIT FOR ≥ 5.0	

The Student Report

Once the evaluations discussed above have been made, a report¹ is printed for the student showing the following:

- name, address, identification number
- whether visiting, probationary or special student
- registration status²
- all courses listed by year. For each course is shown the description, number, weight, grade received, ruling by FRC and the academic term³.
- for each session, the grade point average
- the current load
- total credits earned to date
- for the current session, the quality index
- a summary of the grades received to date also showing the number of courses and total weight for each grade
- the recommended ruling⁴
- the list of required courses remaining

¹Table 3.

²The printing of the title "full time winter session" is suppressed since most students fall in this category.

³1=summer session, 2=first half of winter session, 3=second half of winter session, 4=spring session, 5=supplemental and deferred exams. Not all codes were printed since the information was not given.

⁴If it is recommended that credit be withheld for a grade 3 or 4, the affected courses are noted by "RN" (Recommend No Credit) in the remarks column.

TABLE 3

STUDENT REPORT

STUDENT JOHN Q 012345

10025 JASPER AVE
EDMONTON ALTA

1968/69	GR RM TRM	1969/70	GR RM TRM	1970/71	GR RM TRM
ACCTG202 03 INTRO ACCING	5	ACCTG204 03 MANAGERIAL CONCEPTS	5	BUS 304 03 ORGANIZ BEHAVIOUR	5
BUS 202 06 INTRO TO BUSINESS	6	BUS 306 03 INTRO PROBITY & STAT	6	BUS 310 03 COMMERCIAL LAW	6
ECON 200 06 PRINC OF ECONOMICS	6	BUS 307 03 PROBABILITY & STAT	5	BUS 312 03 GOVERNMENT & BUS	3 S
ENGL 210 06 ENGLISH LANG & LIT	4	BUS 322 06 MANAGERIAL ECON	4	ECON 351 03 THE PUBLIC SECTOR	5
MATH 240 03 ELEMENTARY CALCULUS	5	BUS 332 06 MANAGERIAL ECON	4	ECON 352 03 ECON OF PUB FINANCE	4
P ED 218 N4 FITNESS ACTIVITIES	CR	BUS 357 03 INTRO CMPTUT FOR BUS	5	FIN 304 03 BUSINESS FINANCE	4
SOC 202 06 INTRO SOCIOLOGY	5	MATH 243 03 LINEAR ALGEBRA	5	IND 8304 03 INDUSTRIAL P2L	4
		PSYC0202 06 INTRO GEN PSYCH	5	MANAG356 03 QUANT METH IN BUS	4
				MANAG357 03 QUANT METH IN BUS	5
				MARK 304 03 FUNDNTLS OP-MARK	5

GRADE POINT AVERAGE 156/30 = 5.20

GRADE POINT AVERAGE 156/33 = 4.73

GRADE POINT AVERAGE 123/27 = 4.56

1971/72	GR RM TRM
BUS 312 03 GOVERNMENT AND BUS	AB
BUS 401 03 THEORY CF POL MAKING	5
FIN 401 03 RISK MANAGEMENT	AB
FIN 411 03 INVESTMENT PRINC	AB
FIN 421 03 TAX & ESTATE PLANG	W
FIN 421 03 REPEATED 2ND TERM	
MARK 403 03 COMMUNCTN PROCESSES	1 P
MARK 405 03 QUANT MARK TECH	3 P
MARK 411 03 MARK POL EPROB	4 RN
MARK 414 03 CHANNEL MANAGEMENT	1 RN
MARK 418 03 PSYCC-SOCIO APPRCHS	AB

GRADE POINT AVERAGE 042/15 = 2.80

SUMMARY

NUMBER OF COURSES	TOTAL CREDITS	GRADE	REMARK
4	18	6	
13	45	5	
6	27	4	
1	3	4	
1	3	3	
1	3	3	
1	3	1	
1	3	1	
4	12	AB	
1	4	CR	
2	6	W	
1	3		

CURRENT LOAD= 27 CURRENT GPA=2.80 TOTAL CREDITS TO DATE= 93

QUALITY INDEX (6/30) X GPA = .56

RECOMMENDATION: CAT C, WITHDRAW FROM PROGRAM
 REQUIRED COURSES REMAINING:
 BUS 312

This report becomes the working document for the Faculty Revisions Committee. It contains all the information normally on the Faculty Work Sheets as well as the cumulative information presently displayed on the student record card. No action would be required by the Committee regarding students carrying a full course load whose quality index is between 4.5 and 7.5 or regarding students carrying a partial load whose quality index is greater than or equal to 5.0. Students not in these categories and students classed as "visiting", "Probationary", or "special" would require the attention of the Committee.

Until the decision rules have been validated through experience with this system, this check by the Committee would ensure fair treatment for borderline cases but the Committee's work would be simplified because the necessary cumulative information would be on the report. The record of students whose quality index was greater than or equal to 7.5 would also have to be checked to determine if they met requirements for specific academic honors such as the Dean's List.

Under the present system it is necessary for the Committee to indicate on the worksheets all changes and the courses for which credit should be withheld. After the Registrar changes the students' records accordingly, the programs are re-run to permanently update the computer files and to print the reports in duplicate--one copy for faculty files and one copy for the student. This ensures that the student has

been informed of his situation in the Faculty and that the cumulative computer file has been updated to reflect all changes.

The final step is to print a report ranking the students within each year by grade point average. The criteria for academic rank are not presently well defined. It is not specified for instance, which is better--an average of 7 on thirty credit hours or one of 8 on twenty-four. The present program ranks by grade point average using course load only to break ties. Furthermore, only students carrying a course load of more than twenty-three credit hours are included. The course load is used to break ties if possible --a greater course load being assigned a higher rank. If this does not break the tie, all are given the same rank but the next rank to be assigned is calculated as:

$R + T$; where R = rank assigned, T = number tied.

After all ranks have been calculated, the report is printed in alphabetical order for each year and lists the student's name, his rank, the number of students with this rank, and the course load. A sample of this report is given in Appendix G. Again the present program could easily be modified to implement different ranking criteria.

CHAPTER IV

RECOMMENDATIONS

Although this model meets the given objectives, some changes would enhance its usefulness if it is to be implemented as a working system.

Due to factors beyond the control of the Faculty, some grades are missing from the work sheets although the course name is shown. It would be useful to scan all students' records initially and print out a list of missing grades. These could be investigated and the necessary records updated.

The present reports and recommendations for students are printed in alphabetical order within each year. If these reports were further subdivided, the work of the Committee would be facilitated since students with similar academic problems would be grouped. Such groups could be:

- Category C
- Category B
- Category A, no courses failed
- Category A, one or more prerequisites failed
- Category A, one or more non-prerequisites failed
- Special and probationary students
- Academic honors

Advanced credits present a problem since the Registrar's computer files do not contain this information.

A suggested solution is to collect this information on some machine-readable medium and use it along with the Registrar's information to update the master file prior to printing the student reports. This method would ensure that a master record for the student had been set up before updating.

A table of courses necessary to meet graduation requirements could be made part of each student's record. His progress would then be monitored against this individualized program thus introducing flexibilities which are not now possible to meet individual requirements.

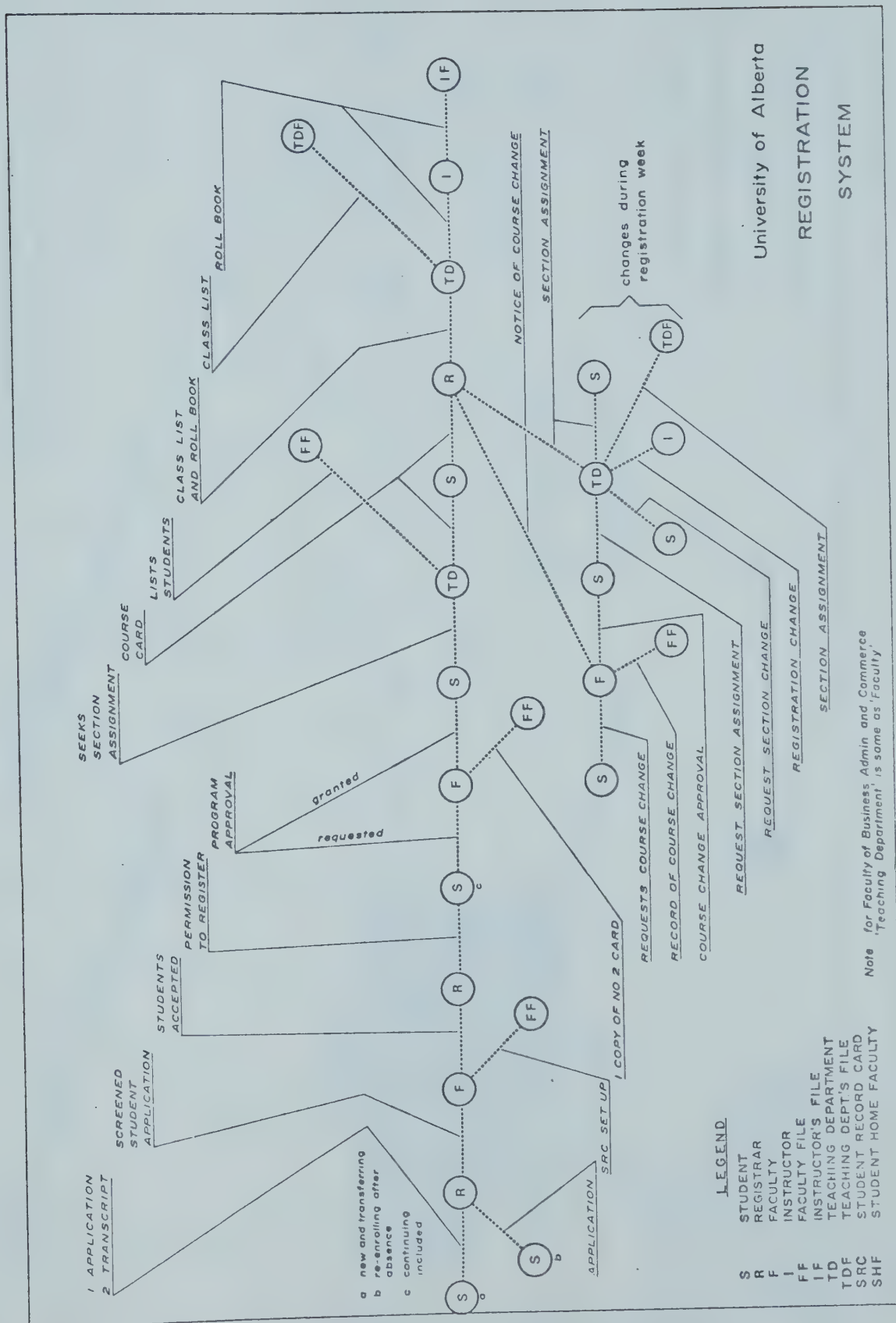
These and other enhancements which will undoubtedly occur to Faculty as they gain more experience with the system can greatly reduce the work load of many people, can make it possible to give greater attention to students requiring it and, yet, if these enhancements are properly incorporated, still keep the Faculty and not the computer in control.

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APPENDIX A



APPENDIX B

CALCULATION OF TIME REQUIRED BY THE REGISTRAR'S
OFFICE TO CONVERT GRADES TO
MACHINE-READABLE FORM

At The University of Alberta the average student course load is five courses per term which means that with 18,000 students approximately 90,000 grades must be processed per term. A student is identified by the computer by his six-digit identification number. Since presently this information would have to be keyed either onto cards or magnetic tape, a total of $7 \times 90,000 = 630,000$ keystrokes would be required to first record this information and then another 630,000 keystrokes would be necessary to verify the information such as course and section. If an average of 10,000 keystrokes per hour¹ is punched, this means that approximately 126 man-hours would be required to enter the information for computer use.

To reduce this time, the Registrar produces pre-numbered examination return forms and because the location of each student is known on each page, only the page number and grade has to be punched. Thus instead of punching about 1,260,000 keystrokes, only about 180,000 strokes are required, reducing the conversion to machine-readable form to about eighteen man-hours.

¹IBM classifies keypunch operators punching this type of data according to the following categories: 8-10,000/hr. = below average, 10-13,000/hr. = average, 13-16,000/hr. = above average.

APPENDIX C

CALCULATION OF TIME REQUIRED TO KEYPUNCH ALL
GRADES IN THE FACULTY OF COMMERCE FOR
SUBMISSION TO THE REGISTRAR

The average course load per student in the Faculty of Business Administration and Commerce is five courses per term. To identify the student to the computer, the student's six-digit identification number as well as his grade would have to be keypunched. Other necessary information such as course, section, faculty could be automatically duplicated and the time for that would be negligible. The Faculty's enrollment is about 1,500 students. This means that $7 \times 1,500 \times 5 = 52,500$ keystrokes would be required. At a conservative 10,000 strokes per hour approximately 5.5 hours would be needed. Verifying requires about the same amount of time which means that all the grades could be submitted to the Registrar in one day if two operators were used².

²Data processing practice is to not use the same operator for verifying and keypunching.

APPENDIX D

PROCEDURE TO ELIMINATE ERRORS IN TRANSCRIBING
GRADES FROM INSTRUCTORS' ROLL BOOKS
TO EXAMINATION RETURNS FORMS

1) After all roll books for a particular course have been received by the Faculty, consecutive numbers are assigned to the students. The last number assigned must be the number of students in the course.

2) The consecutive number assigned to the student is multiplied by the grade he received. Non-numeric grades could be assigned a value of zero or ten. The sum of the products is noted.

3) The sum of the consecutive numbers is calculated

$$\Sigma = \frac{N(N+1)}{2} ; \quad N = \text{number of students in the course}$$

4) The grade and consecutive number are transferred to the examination returns form for the appropriate student home faculty.

5) The multiplication and consequent summing is repeated for each examination return form for each faculty.

6) The consecutive numbers transferred in 4 are summed. This must equal the sum obtained in 3. The sums obtained in 2 and 5 must be equal.

7) If it is desired to update the student record card, the gummed labels made available by the Registrar could be used.

APPENDIX E

PROGRAM LISTING TO PRODUCE STUDENT REPORTS

IDENTIFICATION DIVISION.
 PROGRAM-ID. CUMULATIVE-PRINTOUT.
 AUTHOR. H. KNOPKE.
 DATE-WRITTEN. MAY 1, 1972.
 DATE-COMPILED.
 REMARKS. SELECTS ACTIVE STUDENTS AND PRINTS THEIR
 CUMULATIVE RECORDS.
 ENVIRONMENT DIVISION.
 CONFIGURATION SECTION.
 SOURCE-COMPUTER. IBM-360.
 OBJECT-COMPUTER. IBM-360.
 SPECIAL-NAMES.
 C01 IS TOP-OF-PAGE.
 INPUT-OUTPUT SECTION.
 FILE-CONTROL.
 SELECT PRINT-OUT ASSIGN TO UT-S-SYSOUT.
 SELECT TAPE-IN ASSIGN TO UT-2400-S-STUDENT.
 SELECT ID-IN ASSIGN TO UT-S-IDFILE.
 SELECT RANK-OUT ASSIGN TO UT-S-RANK.
 DATA DIVISION.
 FILE SECTION.
 FD RANK-OUT
 LABEL RECORDS ARE OMITTED
 DATA RECORD IS STU-RANK.
 01 STU-RANK.
 02 SR-ID PIC X(6).
 02 SR-NAME PIC X(20).
 02 SR-GPA PIC 9V99.
 02 SR-YR PIC X.
 02 SR-LOAD PICTURE 999.
 02 SR-CAL-YR PICTURE 99.
 02 FILLER PICTURE X(45).
 FD ID-IN
 LABEL RECORDS ARE OMITTED
 DATA RECORD IS ID-FILE.
 01 ID-FILE.
 02 ID-FILE-NUM PICTURE X(6).
 02 FILLER PICTURE X(74).
 FD TAPE-IN
 RECORD CONTAINS 4224 CHARACTERS
 RECORDING MODE IS U
 LABEL RECORDS ARE STANDARD
 DATA RECORD IS STUDENT-FILE.
 01 STUDENT-FILE.
 02 FIXED-PART.
 03 STU-ID PICTURE X(6).
 03 FILLER PICTURE X(6).
 03 STU-NAME PICTURE X(20).
 03 FILLER PICTURE X(25).
 03 STU-YR PICTURE X.


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03 FILLER          PICTURE X.
03 DEG-PAT-A       PICTURE XX.
03 DEG-PAT-N REDEFINES DEG-PAT-A PICTURE 99.
03 FILLER          PICTURE X(18).
03 REG-STAT-A      PICTURE X.
03 REG-STAT-N REDEFINES REG-STAT-A PICTURE 9.
03 FILLER          PICTURE X(22).
03 LOC-ADD-IND     PICTURE X.
03 LOC-ADD-1       PICTURE X(19).
03 LOC-ADD-2       PICTURE X(15).
03 FILLER          PICTURE X(7).
03 HOME-ADD-IND    PICTURE X.
03 HOME-ADD-1      PICTURE X(19).
03 HOME-ADD-2      PICTURE X(15).
03 FILLER PIC X(53).
03 ACTIVE-INDICATOR PIC 9.
03 FILLER PIC X(149).
03 COURSE-CNT      PICTURE 99.
02 COURSE OCCURS 0 TO 60 TIMES DEPENDING ON
   COURSE-CNT.
03 C-CODE          PICTURE XXX.
03 C-ABB           PICTURE X(8).
03 C-SUP           PICTURE X.
03 C-SEC PIC XX.
03 C-DES           PICTURE X(19).
03 FILLER          PICTURE XXX.
03 C-GRADE         PICTURE XX.
03 C-REN           PICTURE XX.
03 C-WT PIC XX.
03 FILLER          PICTURE X(19).
03 C-TERM PIC X.
03 C-YEAR PIC 99.

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FD PRINT-OUT
  LABEL RECORDS ARE OMITTED
  RECORD CONTAINS 133 CHARACTERS
  RECORDING MODE IS F
  DATA RECORDS ARE PRINT-LINE-1 PRINT-LINE-2 PRINT-LINE-3
  PRINT-LINE-4 PRINT-LINE-5 SUMMARY-LINE-1 SUMMARY-LINE-2
  SUMMARY-LINE-3 SUMMARY-LINE-4.

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01 PRINT-LINE-1.
02 FILLER PIC X.
02 STD-NAME PIC X(20).
02 FILLER PIC X(10).
02 STD-ID PIC X(6).
02 FILLER          PICTURE X(3).
02 REG-STAT-PRINT  PICTURE X(44).
02 DEG-PAT-PRINT   PICTURE X(20).
02 FILLER          PICTURE X(24).

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01 PRINT-LINE-2.
02 FILLER PIC X.
02 FIELD-1 PIC X(44).
02 FIELD-2 PIC X(44).

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02 FIELD-3 PIC X(44).
01 PRINT-LINE-3.
02 FILLER PIC X.
02 STD-ADDRESS PIC X(19).
02 FILLER PIC X(113).
01 PRINT-LINE-4.
02 FILLER PIC X.
02 ADDRESS-2 PIC X(15).
02 FILLER PIC X(117).
01 PRINT-LINE-5.
02 FILLER PIC X.
02 FLD1.
03 FL1 PIC XX.
03 F2 PIC 99.
03 F3 PIC X.
03 F4 PIC 99.
03 F5 PIC X(37).
02 FLD2.
03 FL1 PIC XX.
03 F2 PIC 99.
03 F3 PIC X.
03 F4 PIC 99.
03 F5 PIC X(37).
02 FLD3.
03 FL1 PIC XX.
03 F2 PIC 99.
03 F3 PIC X.
03 F4 PIC 99.
03 F5 PIC X(37).
01 PRINT-LINE-6.
02 FILLER PIC X.
02 FL-1.
03 FILLER PICTURE X(44).
02 FL-2.
03 FILLER PIC X(44).
02 FL-3.
03 FL1 PIC X(22).
03 FL2 PIC 999.
03 FL3 PIC X.
03 FL4 PIC 99.
03 FL5 PIC XXX.
03 FL6 PIC Z.ZZ BLANK WHEN ZERO.
03 FL7 PIC X(9).
01 SUMMARY-LINE-1.
02 FILLER PICTURE X.
02 S-L-1.
03 FILLER PICTURE X(16).
03 S-L-2.
04 FILLER PICTURE X(29).
04 S-L-3 PICTURE ZZ9.
04 FILLER PICTURE X(84).
01 SUMMARY-LINE-2.

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02	FILLER	PICTURE X.
02	S-L-2A	PICTURE ZZZZ.
02	FILLER	PICTURE X(10).
02	S-L-2B	PICTURE ZZZZ.
02	FILLER	PICTURE X(8).
02	S-L-2C	PICTURE X(11).
02	S-L-2D	PICTURE X(95).
01	SUMMARY-LINE-3.	
02	FILLER PIC X(16).	
02	F22 PIC ZZ9.	
02	FILLER PIC X.	
02	F24 PIC Z9.	
02	FILLER PIC X(10).	
02	F26 PIC Z.ZZ BLANK WHEN ZERO.	
02	FILLER PIC X(97).	
01	SUMMARY-LINE-4.	
02	FILLER	PICTURE X(14).
02	TEST1	PICTURE ZZ9.
02	FILLER	PICTURE X(15).
02	TEST2	PICTURE Z.99.
02	FILLER	PICTURE X(25).
02	TEST3	PICTURE ZZ9.
02	FILLER	PICTURE X(69).

WORKING-STORAGE SECTION.

77	ID-CTR PIC 999.
77	ID-SW PIC 9.
77	ID-CTR-1 PIC 999.
77	T-GRADE PIC 9999.
77	AC-IN PIC 9.
77	WEIGHT PIC 99.
77	NO-CRS PIC 99.
77	FIFTEEN PIC 99 VALUE 30.
77	CTR-2 PIC 999.
77	CRS-CNT PIC 99.
77	CR-YR PIC 99.
77	CAL1 PIC 99.
77	CAL2 PIC 99.
77	CAL3 PIC 99.
77	FIN1 PIC 99.
77	FIN2 PIC 99.
77	FIN3 PIC 99.
77	CAL-YEAR-1 PIC 99.
77	CAL-YEAR-2 PIC 99.
77	CTR-1 PICTURE 999 VALUE 0 COMP.
77	HOW-YR PICTURE XX.
77	CUR-YEAR PIC 99.
77	COUNTER PIC 9.
77	TEST PIC X.
77	QI-STORE PIC 9V99.
77	QI-CTR-1 PIC 99.
77	QI-CTR-2 PIC 99.
77	HK-CONST PICTURE 99.


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77 HK-CTR-1          PICTURE 999.
77 HK-CUR-LOAD      PICTURE 999.
77 HK-DEC           PICTURE 99.
77 HK-REC           PICTURE 99.
77 HK-CTR-2          PICTURE 999.
77 HK-IHD-1          PICTURE 99.
77 HK-IHD-2          PICTURE 99.
77 HK1              PICTURE 99.
77 HK2              PICTURE 99.
77 HK3              PICTURE 99.
77 GPA-TEMP PICTURE 9999.
77 GRADE-TEMP PIC XX.
77 Q1-PASS PIC 99.
77 Q1-FAIL PIC 99.
77 Q1              PICTURE 99.
77 Q2              PICTURE 99.
77 TOTAL-CREDITS    PICTURE 999.
77 X               PICTURE 99.
77 Y               PICTURE 99.
77 Z               PICTURE 99.
01 REG-STAT-TABLE.
  02 RST1.
    03 RST00 PIC X(43) VALUE
      'FULL TIME EXTRAMURAL'.
    03 RST01 PIC X(43) VALUE
      'SUMMER SESSION'.
    03 RST02 PIC X(43) VALUE
      'FULL TIME WINTER SESSION'.
    03 RST03 PIC X(43) VALUE
      'EVENING CREDIT AND FULL TIME WINTER SESSION'.
    03 RST04 PIC X(43) VALUE
      'PART TIME WINTER SESSION (EDMONTON)'.
    03 RST05 PIC X(43) VALUE
      'EVENING CREDIT AND PART TIME WINTER SESSION'.
    03 RST06 PIC X(43) VALUE
      'EVENING CREDIT (OFF-CAMPUS)'.
    03 RST07 PIC X(43) VALUE
      'PART TIME EXTRAMURAL'.
    03 RST08 PIC X(43) VALUE
      'REGISTERED AT AFFILIATED INSTITUTION'.
    03 RST09 PIC X(43) VALUE
      'SHORT COURSES'.
  02 RST2 REDEFINES RST1.
    03 REG-STAT OCCURS 10 TIMES PIC X(43).
01 DEG-PAT-TABLE.
  02 DPT1.
    03 DP01 PIC X(20) VALUE 'VISITING STUDENT'.
    03 DP02 PIC X(20) VALUE 'PROBATIONARY STUDENT'.
    03 DP03 PIC X(20) VALUE 'SPECIAL STUDENT'.
  02 DPT2 REDEFINES DPT1.
    03 DEG-PAT OCCURS 3 TIMES PIC X(20).
01 REQ-CRS-TAB.

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02 RCT1.
  03 RC01 PIC X(8) VALUE 'ECON 200'.
  03 RC02 PIC X(8) VALUE 'ENGL 210'.
  03 RC03 PIC X(8) VALUE 'MATH 240'.
  03 RC04 PIC X(8) VALUE 'MATH 243'.
  03 RC05 PIC X(8) VALUE 'ACCTG202'.
  03 RC06 PIC X(8) VALUE 'ACCTG204'.
  03 RC07 PIC X(8) VALUE 'BUS 306'.
  03 RC08 PIC X(8) VALUE 'BUS 307'.
  03 RC09 PIC X(8) VALUE 'BUS 308'.
  03 RC10 PIC X(8) VALUE 'BUS 310'.
  03 RC11 PIC X(8) VALUE 'BUS 322'.
  03 RC12 PIC X(8) VALUE 'BUS 323'.
  03 RC13 PIC X(8) VALUE 'BUS 332'.
  03 RC14 PIC X(8) VALUE 'BUS 333'.
  03 RC15 PIC X(8) VALUE 'BUS 357'.
  03 RC16 PIC X(8) VALUE 'PSYC0202'.
  03 RC17 PIC X(8) VALUE 'BUS 302'.
  03 RC18 PIC X(8) VALUE 'BUS 304'.
  03 RC19 PIC X(8) VALUE 'BUS 312'.
  03 RC20 PIC X(8) VALUE 'BUS 355'.
  03 RC21 PIC X(8) VALUE 'FIN 304'.
  03 RC22 PIC X(8) VALUE 'IND R304'.
  03 RC23 PIC X(8) VALUE 'MANAG356'.
  03 RC24 PIC X(8) VALUE 'MANAG357'.
  03 RC25 PIC X(8) VALUE 'MARK 304'.
  03 RC26 PIC X(8) VALUE 'BUS 400'.
  03 RC27 PIC X(8) VALUE 'BUS 401'.
  03 RC28 PIC X(8) VALUE 'ECON 301'.
  03 RC29 PIC X(8) VALUE '.
  03 RC30 PIC X(8) VALUE '.

02 RCT2 REDEFINES RCT1.
  03 R OCCURS 30 TIMES PIC X(8).

01 CONT-TAB.
  02 T OCCURS 30 TIMES PIC 9.

01 PRINT-LINE-7.
  02 FILLER PIC X.
  02 PLL-1.
    03 PLL7 OCCURS 28 TIMES.
    04 PL-CONMA PIC X.
    04 PL-NAME PIC X(8).
  02 PLL-2 REDEFINES PLL-1.
    03 PLL-L PICTURE X(126).
    03 PLL-R PICTURE X(126).

01 REC-TABLE.
  02 RT1.
    03 REC1 PIC X(50) VALUE
      'CAT A, PROMOTE, (OVERLOAD PERMITTED) '.
    03 REC2 PIC X(50) VALUE
      'CAT A, PROMOTE, (NORMAL LOAD) '.
    03 REC3 PIC X(50) VALUE
      'CAT B, REPEAT YEAR, (NO OVERLOAD) '.

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03 REC4 PIC X(50) VALUE
  'CAT B, REPEAT YEAR, (MAX LOAD      CREDITS PER TERM)'.
03 REC5 PIC X(50) VALUE
  'CAT C, WITHDRAW FROM PROGRAM      '.
03 REC6 PIC X(50) VALUE
  'CAT A, PROMOTE, (NORMAL LOAD)      '.
03 REC7 PIC X(50) VALUE
  'CAT A, PROMOTE, (REMAIN ON PARTIAL LOAD)      '.
03 REC8 PIC X(50) VALUE
  'CAT B, REPEAT YEAR, (REMAIN ON PARTIAL LOAD)      '.
03 REC9 PIC X(50) VALUE
  'CAT C, WITHDRAW FROM PROGRAM      '.
03 REC10 PIC X(50) VALUE
  'FIRST CLASS STANDING      '.
02 RT2 REDEFINES RT1.
  03 RECOMMEND OCCURS 10 TIMES PIC X(50).
01 SS-GPA-TABLE.
  02 SS-GPA-STORE OCCURS 6 TIMES PIC 9V99.
01 QI-TABLE.
  02 QI-ROW OCCURS 21 TIMES.
    03 QI-COL OCCURS 8 TIMES PIC X.
01 COURSE-CONST-HOLER.
  02 CCH-ABB PIC X(8).
  02 CCH-UT PIC 99.
  02 CCH-GRADE.
    03 CCH-H-GRADE PIC 9.
    03 FILLER PIC X.
01 GPA-TABLE.
  02 GPA-STORE OCCURS 6 TIMES PIC 9V99.
01 HK-TAB-1.
  02 HKT-1A.
    03 HKT-1B PIC X(40) VALUE
      '9 8 7 6 5 4 3 2 1 ABAAUCRDBEXF INRCW VF'.
    03 HKT-1C PIC X(20) VALUE SPACES.
  02 HKT-1D REDEFINES HKT-1A.
    03 HKT-1E OCCURS 30 TIMES PICTURE XX.
01 HK-TAB-2.
  02 HKT-2A.
    03 HKT-2B PIC X(16) VALUE
      ' C D F H S + RN'.
    03 HKT-2C PIC X(20) VALUE SPACES.
  02 HKT-2D REDEFINES HKT-2A.
    03 HKT-2E OCCURS 18 TIMES PICTURE XX.
01 HK-GRADE-COLLECT.
  02 HKG-C1 OCCURS 30 TIMES.
    03 HKG-C2 OCCURS 18 TIMES.
      04 HK-GR-HUM PIC 999.
      04 HK-GR-CR PIC 999.
01 YR-ROW.
  02 YEAR-REC OCCURS 6 TIMES.
  03 FILLER1 PIC XX.
  03 STRT-YR-1 PIC 99.

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03 FILLER2 PIC X.
03 FIN-YR-1 PIC 99.
03 FILLER PIC X(37).
01 AVE-LINE-REC.
02 AVE-LINE OCCURS 6 TIMES.
03 WORD PIC X(22).
03 TOT-AVE PIC 999.
03 FILLER3 PIC X.
03 NUM-CRS PIC 99.
03 FILLER4 PIC XX.
03 GPA PIC ZZZ.99.
03 FILLER PIC X(8).
01 SS-AVE-LINE-REC.
02 SS-AVE-LINE OCCURS 6 TIMES.
03 SS-WORD PIC X(22).
03 SS-TOT-AVE PIC 999.
03 SS-FILLER3 PIC X.
03 SS-NUM-CRS PIC 99.
03 SS-FILLER4 PIC XX.
03 SS-GPA PIC ZZZ.99.
03 FILLER PIC X(8).
01 MASTER.
02 STRUCTURE OCCURS 6 TIMES.
03 COURSE-LIST OCCURS 30 TIMES.
04 C-ABB PIC X(8).
04 FILLER PIC X.
04 C-WT PIC XX.
04 FILLER PIC X.
04 C-DES PIC X(19).
04 FILLER PIC X.
04 X-GRADE PIC XX.
04 FILLER PIC X.
04 C-REM PIC XX.
04 FILLER PIC XX.
04 C-TERM PIC X.
04 FILLER PIC X(4).
01 GRADE-HOLDER.
03 A-GRADE PIC X.
03 N-GRADE REDEFINES A-GRADE PIC 9.
03 FILLER PIC X.
01 WT-HOLDER.
02 WT-A PIC XX.
02 WT-N REDEFINES WT-A PIC 99.
01 ID-STORE.
02 ID-NUM-STORE OCCURS 160 TIMES PIC X(6).
PROCEDURE DIVISION.
HSPKG SECTION.
OPEN INPUT TAPE-IN OUTPUT PRINT-OUT.
OPEN INPUT ID-IN.
OPEN OUTPUT RANK-OUT.
MOVE 'YEEEEYE' TO Q1-ROW (1).
MOVE 'YEEEEYE' TO Q1-ROW (2).

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MOVE 'YEEEEEEYE' TO Q1-ROW (3).
MOVE 'YEEEEEEYE' TO Q1-ROW (4).
MOVE 'YEEEEEEYE' TO Q1-ROW (5).
MOVE 'YYENNNNE' TO Q1-ROW (6).
MOVE 'NYENNNNE' TO Q1-ROW (7).
MOVE 'NEENNNNE' TO Q1-ROW (8).
MOVE 'NEENNNNE' TO Q1-ROW (9).
MOVE 'NYENNNNE' TO Q1-ROW (10).
MOVE 'YYEENNEE' TO Q1-ROW (11).
MOVE 'EEEEEEEEE' TO Q1-ROW (12).
MOVE 'YEEEEEEYE' TO Q1-ROW (13).
MOVE 'NYENNNNE' TO Q1-ROW (14).
MOVE 'EEEEEEEEE' TO Q1-ROW (15).
MOVE 'NEENNNNE' TO Q1-ROW (16).
MOVE 'NYENNNNE' TO Q1-ROW (17).
MOVE 'EEEEEEEEE' TO Q1-ROW (18).
MOVE 'EEEEEEEEE' TO Q1-ROW (19).
MOVE 'NEENNNNE' TO Q1-ROW (20).
MOVE 'EEEEEEEEE' TO Q1-ROW (21).
READ ID-IN AT END ALTER PARA-1 TO PROCEED TO DUMMY.
RD-A-STD.
READ TAPE-IN AT END GO TO FINIS.
PARA-1. GO TO PARA-2.
PARA-2.
  IF ID-FILE-NUM = STU-ID GO TO DUMMY1.
  IF ID-FILE-NUM > STU-ID GO TO RD-A-STD.
  READ ID-IN AT END GO TO FINIS.
  GO TO PARA-2.
DUMMY.
  MOVE ACTIVE-INDICATOR TO AC-IN.
  IF ZERO = AC-IN OR COURSE-CNT
    GO TO RD-A-STD.
DUMMY1.
  MOVE ZERO TO TOTAL-CREDITS.
  MOVE SPACES TO COURSE-CONST-HOLER.
  MOVE SPACES TO YR-ROW.
  MOVE SPACES TO AVE-LINE-REC.
  MOVE SPACES TO MASTER PRINT-LINE-7.
  MOVE ZEROS TO Q1-PASS Q1-FAIL.
  MOVE SPACES TO SS-AVE-LINE-REC.
  MOVE SPACES TO CCH-ABB.
  MOVE ZEROS TO CCH-WT CCH-II-GRADE.
  MOVE ZEROS TO GPA-TABLE SS-GPA-TABLE.
  MOVE ZEROS TO CONT-TAB.
DUMMY2.
  MOVE C-YEAR (1) TO CUR-YEAR.
  MOVE 1 TO COUNTER.
  MOVE 1 TO NO-CRS.
  MOVE ZERO TO NUM-CRS (COUNTER).
  MOVE ZERO TO TOT-AVE (COUNTER).
  MOVE ZEROS TO GPA (COUNTER).
  MOVE ZEROS TO STRT-YR-1 (COUNTER).

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MOVE ZEROS TO FIN-YR-1 (COUNTER).
MOVE ZEROS TO SS-TOT-AVE (COUNTER).
MOVE ZEROS TO SS-GPA (COUNTER).
MOVE ZEROS TO SS-NUM-CRS (COUNTER).
MOVE COURSE-CNT TO CRS-CNT.

```

DUMMAY 3.

```

PERFORM E THRU F VARYING TALLY FROM 1 BY 1
UNTIL TALLY IS GREATER THAN
    CRS-CNT.
GO TO G.

```

F.

MOVE C-YEAR (TALLY) TO CR-YR.
IF CR-YR IS EQUAL TO
CUR-YEAR GO TO ASSIGN-COURSES.

LE 2.

```

MOVE '19 /
YEAR-REC (COUNTER).
MOVE CUR-YEAR TO STRT-YR-1 (COUNTER).
ADD 1 CUR-YEAR GIVING FIN-YR-1 (COUNTER).
MOVE 'GRADE POINT AVERAGE ' TO WORD (COUNTER).
MOVE 'SUMMER SESSION GPA' TO SS-WORD (COUNTER).
MOVE '/' TO FILLER3 (COUNTER) SS-FILLER3 (COUNTER).
MOVE '=' TO FILLER4 (COUNTER) SS-FILLER4 (COUNTER).
IF TOT-AVE (COUNTER) IS GREATER THAN ZERO GO TO E25
ELSE MOVE ZEROS TO GPA (COUNTER)
MOVE ZEROS TO GPA-STORE (COUNTER)
MOVE SPACES TO AVE-LINE (COUNTER)
GO TO E26.

```

E25.

DIVIDE NUM-CRS (COUNTER) INTO TOT-AVE (COUNTER)
 GIVING GPA (COUNTER) ROUNDED.
 DIVIDE NUM-CRS (COUNTER) INTO TOT-AVE (COUNTER)
 GIVING GPA-STORE (COUNTER) ROUNDED.

E26.

```
IF SS-TOT-AVE (COUNTER) > 0 NEXT SENTENCE
ELSE MOVE ZEROS TO SS-GP (COUNTER) S-GPA-STORE
(COUNTER) MOVE SPACES TO SS-AVE-LINE (COUNTER)
GO TO E3.
COMPUTE SS-GPA (COUNTER) ROUNDED = SS-TOT-AVE (COUNTER)
/ SS-NUM-CRS (COUNTER).
COMPUTE SS-GPA-STORE (COUNTER) ROUNDED =
SS-TOT-AVE (COUNTER) / SS-NUM-CRS (COUNTER).
```

E3.

E4.

```

MOVE C-YEAR (TALLY) TO CUR-YEAR.
MOVE 1 TO NO-CRS.
ADD 1 TO COUNTER.
MOVE ZEROS TO
SS-TOT-AVE (COUNTER)
SS-NUM-CRS (COUNTER)
SS-GPA (COUNTER).
MOVE ZEROS TO TOT-AVE (COUNTER).

```


MOVE ZEROS TO NUM-CRS (COUNTER).
 MOVE ZEROS TO GPA (COUNTER).
 MOVE ZEROS TO STRT-YR-1 (COUNTER).
 MOVE ZEROS TO FIN-YR-1 (COUNTER).

ASSIGN-COURSES.

MOVE CORRESPONDING COURSE (TALLY) TO COURSE-LIST
 (COUNTER, NO-CRS).
 MOVE C-GRADE (TALLY) TO X-GRADE (COUNTER, NO-CRS).
 MOVE C-GRADE (TALLY) TO GRADE-HOLDER GRADE-TEMP.
 MOVE C-WT IN STUDENT-FILE (TALLY) TO WT-HOLDER.
 ADD 1 TO NO-CRS.
 IF WT-HOLDER NOT NUMERIC GO TO F.
 MOVE 20 TO Q1.
 MOVE 7 TO Q2.
 MOVE TALLY TO HK-CTR-1.
 PERFORM GRADE-RULE-DECISION.
 IF TEST = 'Y' ADD WT-N TO TOTAL-CREDITS
 PERFORM COURSE-CONTROL THRU CC-EXIT VARYING X FROM 1 BY
 1 UNTIL X > 28.

CRS-CONT-EXIT.

IF A-GRADE IS NUMERIC GO TO H
 ELSE GO TO F.

H.

MULTIPLY WT-N BY N-GRADE GIVING T-GRADE.
 IF C-TERM IN COURSE (TALLY) = '1'
 ADD T-GRADE TO SS-TOT-AVE (COUNTER)
 ADD WT-N TO SS-NUM-CRS (COUNTER)
 GO TO F.
 ADD T-GRADE TO TOT-AVE (COUNTER).
 ADD WT-N TO NUM-CRS (COUNTER).
 IF NO-CRS > 1 AND CCH-ABB EQUAL TO C-ABB IN COURSE
 (TALLY) PERFORM GPA-UPDATE THRU GPA-U-END ELSE PERFORM
 COMPARE-MOVE.

F.

G. PERFORM E2 THRU E3.

CURRENT-LOAD-FIND SECTION.

MOVE C-YEAR (COURSE-CNT) TO HK-CONST.
 MOVE ZERO TO HK-CUR-LOAD.
 PERFORM C-L-F THRU C-L-F-END VARYING HK-CTR-1 FROM
 COURSE-CNT BY -1 UNTIL HK-CTR-1 LESS THAN 1.

CLF-PAR-1.

ADD 1 TO HK-CTR-1.
 PERFORM DECISION-TABLE.
 MOVE ZERO TO CTR-2.
 PERFORM GRADE-MODIFICATION THRU GM-END VARYING HK-CTR-2
 FROM HK-CTR-1 BY 1 UNTIL HK-CTR-2 > COURSE-CNT.

EXTRA-1 SECTION.

MOVE SPACES TO PRINT-LINE-1.
 MOVE STU-ID TO STD-ID.
 MOVE STU-NAME TO STD-NAME.
 IF DEG-PAT-A NUMERIC IF DEG-PAT-N > 96
 SUBTRACT 96 FROM DEG-PAT-N MOVE DEG-PAT (DEG-PAT-N)

TO DEG-PAT-PRINT.
 IF REG-STAT-A NUMERIC ADD 1 REG-STAT-N GIVING Q1
 MOVE REG-STAT (Q1) TO REG-STAT-PRINT IF REG-STAT-N
 = 2 MOVE SPACES TO REG-STAT-PRINT.

I.
 WRITE PRINT-LINE-1 AFTER TOP-OF-PAGE.
 MOVE SPACES TO PRINT-LINE-1.
 IF HOME-ADD-IND IS EQUAL TO ZERO GO
 TO LOCAL.
 MOVE HOME-ADD-1 TO STD-ADDRESS.

J.
 WRITE PRINT-LINE-3 AFTER ADVANCING 2 LINES.
 MOVE SPACES TO PRINT-LINE-1.
 MOVE HOME-ADD-2 TO ADDRESS-2.

K.
 WRITE PRINT-LINE-4 AFTER ADVANCING 1 LINES.
 MOVE SPACES TO PRINT-LINE-1.
 GO TO DUMP.

LOCAL.
 MOVE LOC-ADD-1 TO STD-ADDRESS.
 WRITE PRINT-LINE-3 AFTER ADVANCING 2
 LINES.
 MOVE SPACES TO PRINT-LINE-1.
 MOVE LOC-ADD-2 TO ADDRESS-2.
 WRITE PRINT-LINE-4 AFTER ADVANCING 1 LINES.
 MOVE SPACES TO PRINT-LINE-1.

DUMP.
 MOVE YEAR-REC (1) TO FLD1.
 MOVE YEAR-REC (2) TO FLD2.
 MOVE YEAR-REC (3) TO FLD3.
 WRITE PRINT-LINE-5 AFTER 2.
 MOVE SPACES TO PRINT-LINE-1.
 PERFORM A THRU B VARYING TALLY FROM 1 BY
 1 UNTIL TALLY IS GREATER THAN FIFTEEN.
 GO TO H.

A.
 MOVE COURSE-LIST (1, TALLY) TO FIELD-1.
 MOVE COURSE-LIST (2, TALLY) TO FIELD-2.
 MOVE COURSE-LIST (3, TALLY) TO FIELD-3.
 IF PRINT-LINE-2 = SPACES GO TO M.
 WRITE PRINT-LINE-2 AFTER ADVANCING 1 LINES.
 MOVE SPACES TO PRINT-LINE-1.

B.

H.
 MOVE AVE-LINE (1) TO FL-1.
 MOVE AVE-LINE (2) TO FL-2.
 MOVE AVE-LINE (3) TO FL-3.
 IF PRINT-LINE-2 = SPACES NEXT SENTENCE ELSE
 WRITE PRINT-LINE-6 AFTER ADVANCING 2 LINES
 MOVE SPACES TO PRINT-LINE-1.
 MOVE SS-AVE-LINE (2) TO FL-2.
 MOVE SS-AVE-LINE (1) TO FL-1.

MOVE SS-AVE-LINE (3) TO FL-3.
 IF PRINT-LINE-2 = SPACES NEXT SENTENCE ELSE
 WRITE PRINT-LINE-6 AFTER 1
 MOVE SPACES TO PRINT-LINE-1.
 MOVE YEAR-REC (4) TO FLD1.
 MOVE YEAR-REC (5) TO FLD2.
 MOVE YEAR-REC (6) TO FLD3.
 IF PRINT-LINE-1 = SPACES GO TO L.
 WRITE PRINT-LINE-5 AFTER 3.
 MOVE SPACES TO PRINT-LINE-1.
 PERFORM C THRU D VARYING TALLY FROM 1 BY 1
 UNTIL TALLY IS GREATER THAN
 FIFTEEN.
 GO TO L.

C.

MOVE COURSE-LIST (4, TALLY) TO FIELD-1.
 MOVE COURSE-LIST (5, TALLY) TO FIELD-2.
 MOVE COURSE-LIST (6, TALLY) TO FIELD-3.
 IF PRINT-LINE-1 = SPACES GO TO L.
 WRITE PRINT-LINE-2 AFTER ADVANCING 1 LINES.
 MOVE SPACES TO PRINT-LINE-1.

D.

L.

MOVE AVE-LINE (4) TO FL-1.
 MOVE AVE-LINE (5) TO FL-2.
 MOVE AVE-LINE (6) TO FL-3.
 IF PRINT-LINE-2 = SPACES NEXT SENTENCE ELSE
 WRITE PRINT-LINE-6 AFTER ADVANCING 2 LINES
 MOVE SPACES TO PRINT-LINE-1.
 MOVE SS-AVE-LINE (4) TO FL-1.
 MOVE SS-AVE-LINE (5) TO FL-2.
 MOVE SS-AVE-LINE (6) TO FL-3.
 IF PRINT-LINE-2 = SPACES NEXT SENTENCE ELSE
 WRITE PRINT-LINE-6 AFTER 1
 MOVE SPACES TO PRINT-LINE-1.

EXTRA-2 SECTION.

PERFORM GRADE-COLLECTION.
 PERFORM GRADE-COLLECTION-PRINT.
 PERFORM RECOM-PRINT.
 GO TO EXTRA-4.

GRADE-COLLECTION-PRINT SECTION.

MOVE SPACES TO SUMMARY-LINE-1.
 MOVE 'SUMMARY' TO S-L-1.
 WRITE SUMMARY-LINE-1 AFTER ADVANCING 2 LINES.
 MOVE ' NUMBER OF TOTAL GRADE REMARK'
 TO SUMMARY-LINE-1.
 WRITE SUMMARY-LINE-1 AFTER ADVANCING 2 LINES.
 MOVE ' COURSES CREDITS' TO SUMMARY-LINE-1.
 WRITE SUMMARY-LINE-1 AFTER ADVANCING 1 LINES.
 MOVE SPACES TO PRINT-LINE-1.
 PERFORM GC-PRINT-OUT VARYING HK1 FROM 1 BY 1 UNTIL
 HK1 > HK-IND-1.

RECOM-PRINT SECTION.

```

MOVE ' CURRENT LOAD=          CURRENT GPA=
'TOTAL CREDITS TO DATE=' TO SUMMARY-LINE-4.
MOVE HK-CUR-LOAD TO TEST1 SR-LOAD.
MOVE GPA-STORE (COUNTER) TO TEST2.
MOVE TOTAL-CREDITS TO TEST3.
MOVE STU-ID TO SR-ID.
MOVE STU-NAME TO SR-NAME.
MOVE GPA-STORE (COUNTER) TO SR-GPA.
MOVE STU-YR TO SR-YR.
MOVE C-YEAR (COURSE-CNT) TO SR-CAL-YR.
WRITE STU-RANK.
WRITE SUMMARY-LINE-2 AFTER ADVANCING 1 LINES.
MOVE ' QUALITY INDEX (    /    ) X GPA = ' TO PRINT-LINE-1.
COMPUTE F26 = QI-STORE.
MOVE QI-PASS TO F22.
MOVE QI-FAIL TO F24.
WRITE PRINT-LINE-1 AFTER ADVANCING 2 LINES.
MOVE ' RECOMMENDATION:' TO SUMMARY-LINE-1.
MOVE RECOMMEND (HK-REC) TO S-L-2.
IF HK-REC = 4 COMPUTE S-L-3 ROUNDED =
(HK-CUR-LOAD - 6) / 2.
WRITE SUMMARY-LINE-1 AFTER ADVANCING 2 LINES.
IF T (9) = 1 MOVE 1 TO T (7) T (8) ELSE MOVE 1 TO T (9).
IF T (28) = 1 MOVE 1 TO T (11) T (13) ELSE MOVE 1
TO T (28).
IF T (11) = 1 MOVE 1 TO T (12) ELSE MOVE 1 TO T (11).
IF T (13) = 1 MOVE 1 TO T (14) ELSE MOVE 1 TO T (13).
IF T (20) = 1 MOVE 1 TO T (23) T (24) ELSE MOVE 1
TO T (20).
IF T (17) = 1 MOVE 1 TO T (18) ELSE MOVE 1 TO T (17).
IF T (26) = 1 MOVE 1 TO T (27) ELSE MOVE 1 TO T (26).
MOVE 1 TO Y.
PERFORM PRINT-COLLECT THRU P-C-END VARYING
Z FROM 1 BY 1 UNTIL Z > 27.
IF Y > 1 MOVE ' REQUIRED COURSES REMAINING:'
TO PRINT-LINE-1 WRITE PRINT-LINE-1 AFTER 1
SUBTRACT 1 FROM Y MOVE SPACE TO
PL-COMMA (1) PL-COMMA (15) MOVE
PLL-L TO PRINT-LINE-1 WRITE
PRINT-LINE-1 AFTER 1 MOVE
PLL-R TO PRINT-LINE-1 WRITE
PRINT-LINE-1 AFTER 1.

```

RECOM-PR-END. EXIT.

GRADE-COLLECTION SECTION.

```

MOVE ZEROS TO HK-GRADE-COLLECT.
MOVE 20 TO HK-IND-1. MOVE 7 TO HK-IND-2.
PERFORM GR-COLL THRU GR-COLL-END VARYING HK1 FROM
1 BY 1 UNTIL HK1 > COURSE-CNT.
GO TO G-C-END.

```

GR-COLL.

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PERFORM GRADE-TAB THRU GTEXTIT VARYING HK2 FROM 1 BY 1

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      UNTIL HK2 > HK-IND-1.
      MOVE HK2 TO HK-IND-1.
      MOVE C-GRADE (HK1) TO HKT-1E (HK2).
GR-COLL-1.
      PERFORM REM-TAB THRU RTEXT VARYING HK3 FROM 1 BY 1
      UNTIL HK3 > HK-IND-2.
      MOVE HK3 TO HK-IND-2.
      MOVE C-REN IN COURSE (HK1) TO HKT-2E (HK3).
GR-COLL-2.
      ADD 1 TO HK-GR-MUM (HK2, HK3).
      MOVE C-WT IN COURSE (HK1) TO WT-HOLDER.
      IF WT-A NUMERIC ADD WT-N TO
      HK-GR-CR (HK2, HK3).
GR-COLL-END. EXIT.
G-C-END. EXIT.
DECISION-TABLE SECTION.
      MOVE ZERO TO HK-DEC HK-REC.
      MOVE GPA-STORE (COUNTER) TO GPA-TEMP.
      ADD QI-PASS TO QI-FAIL.
      IF QI-FAIL = ZERO COMPUTE QI-STORE = 0 ELSE
      COMPUTE QI-STORE ROUNDED =
      (QI-PASS / QI-FAIL) * GPA-STORE (COUNTER).
      IF HK-CUR-LOAD IS LESS THAN 30 GO
      TO LESS-THAN-30.
      IF QI-STORE < 7.5 NEXT SENTENCE ELSE
      MOVE 10 TO HK-REC MOVE 1 TO HK-DEC GO TO DT-EXIT.
      IF QI-STORE < 6.5 NEXT SENTENCE ELSE
      MOVE 1 TO HK-REC MOVE 1 TO HK-DEC GO TO DT-EXIT.
      IF QI-STORE < 4.5 NEXT SENTENCE ELSE
      MOVE 2 TO HK-REC MOVE 1 TO HK-DEC GO TO DT-EXIT.
      IF QI-STORE < 3.5 NEXT SENTENCE ELSE
      MOVE 3 TO HK-REC MOVE 2 TO HK-DEC GO TO DT-EXIT.
      IF QI-STORE < 2.0 NEXT SENTENCE ELSE
      MOVE 4 TO HK-REC MOVE 2 TO HK-DEC GO TO DT-EXIT.
      MOVE 5 TO HK-REC MOVE 2 TO HK-DEC GO TO DT-EXIT.
LESS-THAN-30.
      IF QI-STORE < 5.0 NEXT SENTENCE ELSE
      MOVE 6 TO HK-REC MOVE 1 TO HK-DEC GO TO DT-EXIT.
      IF QI-STORE < 4.5 NEXT SENTENCE ELSE
      MOVE 7 TO HK-REC MOVE 1 TO HK-DEC GO TO DT-EXIT.
      IF QI-STORE < 3.0 NEXT SENTENCE ELSE
      MOVE 8 TO HK-REC MOVE 2 TO HK-DEC GO TO DT-EXIT.
      MOVE 9 TO HK-REC MOVE 2 TO HK-DEC GO TO DT-EXIT.
DT-EXIT. EXIT.
GRADE-RULE-DECISION SECTION.
      PERFORM QI-FIND THRU QI-F-END VARYING QI-CTR-1
      FROM 1 BY 1 UNTIL QI-CTR-1 > Q1.
      SUBTRACT 1 FROM QI-CTR-1.
QI-1-EXIT.
      PERFORM QR-FIND THRU QR-END VARYING QI-CTR-2
      FROM 1 BY 1 UNTIL QI-CTR-2 > Q2.
      SUBTRACT 1 FROM QI-CTR-2.

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Q1-2-EXIT.
    MOVE Q1-COL (Q1-CTR-1, Q1-CTR-2) TO TEST.
    GO TO G-R-D-END.
Q1-FIND.
    IF GRADE-TEMP = HKT-1E (Q1-CTR-1) GO TO Q1-1-EXIT.
Q1-F-END.
QR-FIND.
    IF C-REM IN COURSE (HK-CTR-1) = HKT-2E (Q1-CTR-2)
        GO TO Q1-2-EXIT.
QR-END. EXIT.
G-R-D-END. EXIT.
MISC-ROUTINES SECTION.
PRINT-COLLECT.
    IF T (Z) NOT EQUAL TO 1 MOVE
        R (Z) TO PL-NAME (Y) MOVE ', ' TO PL-COMMA (Y) ADD
        1 TO Y.
P-C-END. EXIT.
COURSE-CONTROL.
    IF R (X) = C-ABB IN COURSE (HK-CTR-1)
        MOVE 1 TO T (X) GO TO CRS-CONT-EXIT.
CC-EXIT. EXIT.
C-L-F.
    IF C-YEAR (HK-CTR-1) IS NOT EQUAL TO HK-CONST
        GO TO CLF-PAR-1.
    MOVE C-WT IN COURSE (HK-CTR-1) TO WT-HOLDER.
    IF WT-A NOT NUMERIC GO TO C-L-F-END.
    IF C-TERM IN COURSE (HK-CTR-1) = '1' GO TO C-L-F-END.
    MOVE C-GRADE (HK-CTR-1) TO GRADE-TEMP GRADE-HOLDER.
    IF ((A-GRADE IS NUMERIC) OR
        (GRADE-TEMP = 'AB') OR
        (GRADE-TEMP = 'AE') OR
        (GRADE-TEMP = 'CR') OR
        (GRADE-TEMP = 'DB') OR
        (GRADE-TEMP = 'F ') OR
        (GRADE-TEMP = 'IN') OR
        (GRADE-TEMP = 'WF')) ADD
        WT-N TO HK-CUR-LOAD.
    MOVE 20 TO Q1.
    MOVE 1 TO Q2.
    PERFORM GRADE-RULE-DECISION.
    IF TEST = 'Y' ADD WT-N TO Q1-PASS.
    IF TEST = 'N' ADD WT-N TO Q1-FAIL.
C-L-F-END. EXIT.
GRADE-MODIFICATION.
    ADD 1 TO CTR-2.
    MOVE C-GRADE (HK-CTR-2) TO GRADE-HOLDER.
    IF A-GRADE NOT NUMERIC GO TO GM-END.
    IF C-REM IN COURSE (HK-CTR-2) NOT = SPACES GO TO GM-END.
    IF HK-DEC = 1 GO TO GM-1.
    IF N-GRADE < 5 MOVE
        'RN' TO C-REM IN COURSE (HK-CTR-2)
    C-REM IN COURSE-LIST (COUNTER, CTR-2).

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      GO TO GM-END.
GM-1.
      IF N-GRADE < 4 MOVE 'RN' TO C-REM IN COURSE (HK-CTR-2)
      C-REM IN COURSE-LIST (COUNTER, CTR-2).
GM-END. EXIT.
GRADE-TAB.
      IF HKT-1E (HK2) = C-GRADE (HK1) GO TO GR-COLL-1.
GTEXTIT. EXIT.
REM-TAB.
      IF HKT-2E (HK3) = C-REM IN COURSE (HK1) GO TO GR-COLL-2.
RTEXTIT. EXIT.
GC-PRINT-OUT.
      PERFORM GC-P-2 THRU GCP2EXIT VARYING HK2 FROM 1 BY 1
      UNTIL HK2 > HK-IND-2.
GC-P-2.
      IF HK-GR-NUM (HK1, HK2) NOT = ZERO
      MOVE SPACES TO SUMMARY-LINE-2 MOVE
      HK-GR-NUM (HK1, HK2) TO S-L-2A MOVE
      HK-GR-CR (HK1, HK2) TO S-L-2B MOVE
      HKT-1E (HK1) TO S-L-2C MOVE
      HKT-2E (HK2) TO S-L-2D WRITE
      SUMMARY-LINE-2 AFTER ADVANCING 1 LINES.
GCP2EXIT. EXIT.
GPA-UPDATE.
      IF CCH-N-GRADE > N-GRADE
      COMPUTE TOT-AVE (COUNTER) =
      TOT-AVE (COUNTER) - WT-N * N-GRADE
      COMPUTE NUM-CRS (COUNTER) =
      NUM-CRS (COUNTER) - WT-N ELSE
      COMPUTE TOT-AVE (COUNTER) =
      TOT-AVE (COUNTER) - CCH-WT * CCH-N-GRADE
      COMPUTE NUM-CRS (COUNTER) =
      NUM-CRS (COUNTER) - CCH-WT
      PERFORM COMPARE-MOVE.
GPA-U-END. EXIT.
COMPARE-MOVE.
      MOVE C-ABB IN COURSE (TALLY) TO CCH-ABB.
      MOVE WT-N TO CCH-WT.
      MOVE N-GRADE TO CCH-N-GRADE.
EXTRA-4 SECTION.
      GO TO RD-A-STD.
FINIS.
      MOVE ' END OF PROGRAM' TO PRINT-LINE-1.
      WRITE PRINT-LINE-1 AFTER TOP-OF-PAGE.
      CLOSE TAPE-IN PRINT-OUT.
      CLOSE ID-IN.
      CLOSE RANK-OUT.
      STOP RUN.

```


APPENDIX F

REVISIONS COMMITTEE WORK SHEETS¹

Format

On the Revisions Committee Work Sheets appears a summary of student results reported by the teaching staff. An explanation of symbols used by instructors and already printed in the "INSTRUCTOR" column on the Work Sheets, follows:

In the "GRADE" column

- AB - absent from final exam
- AU - auditor
- CR - completed course requirements
- *DB - debarred from final exam
- EX - exempt
- F - fail
- *IN - incomplete
- *RC - registration cancelled
- *W - withdrew with permission
- *WF - withdrew failing

In the "REC" column

- if the "GRADE" column is blank, no Examination Return has been received for the course. Please contact the instructor.

*These entries should have been used by an instructor, only with the approval of the Dean concerned.

Instructions

If the grade and recommendations made by instructors are completely acceptable, no entries are required in the

¹Registrar, University of Alberta, 1972, Instructions for Faculty Revisions Committees.

red-shaded columns headed "FACULTY."

If the Instructor's recommendation (F or S) is not acceptable, please complete this form by inserting BOTH THE GRADE AND THE REVISED RULING in the FACULTY column.

If a missing grade or a revised grade is obtained from an instructor, it should be entered in the FACULTY column.

If a grade of "AB" is shown, a ruling should be entered in the FACULTY column and shown as "AB F" or "AB D."

If a grade of "3" is shown, a ruling should normally be entered in the FACULTY column and shown as "3 F" or "3 S" or "3 C."

If a grade of "2" or "1" is shown, a ruling must be entered in the FACULTY column.

If a course is extra to the degree program, this should be indicated by writing "+" in the appropriate red-shaded column.

Accepted Symbols

Use only the following symbols, which correspond to the symbols explained for students on the Statement of Results. Other symbols cannot be accepted.

In the "GRADE" column

AB - absent from final exam
 AE - granted aegrotat standing
 AU - auditor
 CR - completed course requirements
 DB - debarred from final exam
 EX - exempt
 F - fail
 IN - incomplete
 RC - registration cancelled
 W - withdrew with permission
 WF - withdrew failing

In the "RULING" column

C - credit conceded
 D - granted deferred final exam
 F - failure, no supplemental granted
 N - passed, but credit withheld
 S - failure, supplemental granted

In the "+" column

+ - course extra to degree requirements

Grade Points

Grade Points are calculated by multiplying the student's GRADE in a course by the course's WEIGHT FACTOR. If there is no grade or it is not used in computing the student's Grade Point Average, the Weight Factor and Grade Points will be enclosed in brackets and excluded from the totals for those columns.

Grade Point Average

Grade Point Average (G.P.A.) is calculated by dividing the total Grade Points by the total Weights. The results of Supplemental Examinations are excluded from the calculation.

G.P.A.'s are computed only for students for whom no Grades are missing from the Work Sheet.

If the record for a student was incomplete at the time the Work Sheets were prepared, Totals and Grade Point

Averages will be calculated by computer after the missing marks have been entered by the Faculty Revisions Committee. Therefore, it is not necessary for Revisions Committees to amend Totals or calculate G.P.A.'s in such cases unless they wish to do so for the Faculty records.

Quality Index

The Quality Index is used in determining the categorization of a student.

$$QI = \frac{\text{Number of Credits Passed}}{\text{Number of Credits Attempted}} \times \text{Grade Point Average}$$

Retention of Credit

Students retain credit in subjects in which they achieve a grade of 5 or higher, when made Category "C" or for other reasons are required to repeat all or most of a year.

Category A

A student would be placed in Category "A" if he achieves a Quality Index of 4.0 or higher. He is promotable, unless the promotion requirements of a faculty or school dictate otherwise. In some instances the writing of a supplemental may be required, or there may be denial of credit in one subject because of poor grade.

Category B

A student will be placed in Category "B" if he achieves a Quality Index of greater than 2.0 and less than 4.0. Individual decision will be required with respect to the granting of supplemental privileges and the requirement to repeat all or part of the work taken. If required to repeat, he will retain credit in any subject in which a grade of 5 or higher has been achieved. Such a student may be advised that he is in danger of failing to meet the requirements for promotion or graduation, and he may be advised to consult the Student Counselling Services with respect to his vocational and academic plans.

Category C

A student would be placed in Category "C" if the Quality Index is 2.0 or less. While he would retain credit in any subject in which he achieved a grade of 5 or higher he would not be granted supplementals and would be required to withdraw from the Faculty in which he was last registered. A second registration would not be permitted until the Dean is reasonably satisfied that it is likely that the student will be able to make satisfactory academic progress (normally a minimum of one year would be required for this purpose). The Dean of the Faculty may require counselling and a report from the Director of the Student Counselling Services is seeking to evaluate an application for re-admission.

Students in Quota Faculties Who Fail to Meet
Promotion Requirements

Students in the Faculties of Dentistry, Law, or Medicine, or the School of Dental Hygiene or Rehabilitation Medicine, who have failed to meet promotion standards but do not have Quality Indexes that would place them in either Category "B" or "C," will not be placed in these categories:

Academic Ruling

After the student's record has been reviewed, an academic ruling may be entered in the REMARKS column. Some of the rulings appropriate for your Faculty are given on the attached sheet.

When Revisions Committee Work Sheets are complete, please hand deliver to the Office of the Registrar, or phone 3852, and we will arrange to have them picked up. Please do not mail.

APPENDIX G

SAMPLE STUDENT RANKING REPORT

1971/72 CLASS STANDING IN YEAR 1 FOR 381 STUDENTS

NAME	ID NO.	RANK		GPA	LOAD
CAMPBELL R	368302	19	(4 TIED)	7.10	30
CARSON G	253864	32	(2 TIED)	6.80	30
CARTER M	283079	10		7.50	30
CHAN A C	397461	252	(8 TIED)	4.80	30
CHAPMAN A B C	293584	225	(3 TIED)	5.13	24
CHRISTENSON T Y	257443	210		5.25	30
CLARK X YZ	353666	297	(2 TIED)	4.44	30
COLLINS A B	230744	67	(4 TIED)	6.40	30
COOPER R R	314334	231	(6 TIED)	5.10	30
CROSS G W	360481	102	(10 TIED)	6.00	30
DAVIES R M	206611	48	(14 TIED)	6.50	30
DIXON W K	306890	357	(5 TIED)	3.70	30
DONALD J G	299696	351	(4 TIED)	3.80	30
DOUGLAS E A	391072	357	(5 TIED)	3.70	30
DUNN F R G	349658	252	(8 TIED)	4.80	30
EDMONTON A C	310917	71		6.38	30
EVANS A B	378147	25	(7 TIED)	6.90	30
FITZGERALS L J	324970	216	(6 TIED)	5.20	30
FITZPATRICK Y T	368408	357	(5 TIED)	3.70	30
FLEMING J K	231954	231	(6 TIED)	5.10	30
FOX Q W	242551	344	(2 TIED)	4.00	24
FREEMAN W R	324942	114	(6 TIED)	5.90	30
FRENCH A B	226086	102	(10 TIED)	6.00	30
GARDNER A J T	218918	24		7.00	30
GIBSON J H	254918	93	(8 TIED)	6.10	30
GORDON B B	200600	251		4.88	27
GRAHAM G L	282859	102	(10 TIED)	6.00	30
GREEN J P	205376	48	(14 TIED)	6.50	30
HALL A D	341964	42	(4 TIED)	6.60	30
HANSEN A J	387579	197	(13 TIED)	5.30	30
HENDERSON B K	247982	42	(4 TIED)	6.60	30
HENDRICK H K	236180	67	(4 TIED)	6.40	30
HOLMES SHERLOCK	236180	145	(4 TIED)	5.67	30
HUGHES M E	236180	196		5.30	33
JAMES M M	263508	7		7.70	30
JOHNSON B E	377398	168	(3 TIED)	5.50	24
JONES P O	330412	299	(3 TIED)	4.44	27
KELLY D K	336269	76	(8 TIED)	6.30	30
KING F G	277163	252	(8 TIED)	4.80	30
KLEIN A H	299948	245	(3 TIED)	4.90	30
KOWALSKI	277545	12	(3 TIED)	7.30	30

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